Program: Civil Engineering

COURSE OUTCOMES

Vision

To be the leading department providing quality education to develop competent Civil Engineers, Entrepreneurs, and innovators to serve the nation.

Mission

M1-To provide technical education.

M2- To prepare competitive students for employment/self-employment

M3–Tofocusondevelopingtheprofessionalskillsaswellasthevalues

Program Educational Objectives

1. To ensure that graduates will have a mastery of fundamental knowledge, problem solving skills, engineering experimental abilities, and design capabilities necessary for entering civil engineering career and/or graduate school.
2. To incorporate verbal and written communication skills necessary for successful professional practice.
3. Demonstrate knowledge of management principles and engineering techniques for effective project management.
4. To prepare graduates to deal with ethical and professional issues, taking into account the broader societal implications of civil engineering.

Program Outcomes

PO1	**Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 to develop to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development (WK1 to WK4)
PO3	**Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required (WK5).
PO4	**Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions (WK8).
PO5	**Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6).
PO6	**The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1,WK5 and WK7).
PO7	**Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9).
PO8	**Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams
PO9	**Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.
PO10	**Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO11	**Life-Long Learning:** Recognize the need for, and have the preparation and ability for i) Independent and life-long learning, ii) Adaptability to new and emerging technologies and iii) Critical thinking in the broadest context of technological change. (WK8).

Program Specific Outcome

PSO 1	Graduates will apply technical knowledge, engineering skills, and competencies necessary for entering civil engineering career.
PSO 2	Graduates will demonstrate knowledge and techniques in engineering fields for effective management and professional development.
PSO 3	Graduates will apply technical and professional skills to be nationally competitive for employment/self-employment thereby benefit the society.

SY. B.TECH Civil
Course Outcomes (2019 Pattern)

Semester – I

Course Code	Course: Building Planning and Technology (105301)
CO1	Identify types of building and basic requirements of building construction and masonry.
CO2	Make use of Architectural Principles and Building byelaws for building construction.
CO3	Identify and select various building components according to their requirement.
CO4	Plan effectively various types of Residential Building and green building according to their utility, functions with reference to National Building Code.
CO5	Plan effectively various types of Public Building.

Course Code	Course: Mechanics of Structure (105302)
CO1	Describe stress-strain and determine various types of stress, strain in determinate, homogeneous and composite structures.
CO2	Calculate shear force and bending moment in determinate beams for various loading conditions and illustrate shear force and bending moment diagram
CO3	Determine, bending stresses, shear stresses and Principal stresses.
CO4	Analyze axially loaded and eccentrically loaded column
CO5	Determine the slopes and deflection of determinate beams and trusses

Course Code	Course: Fluid Mechanics (105303)
CO1	Identify fluid properties, fluid statics, and its application.
CO2	Perform dimensional analysis and boundary layer theory for solving practical problems of fluid flow.
CO3	Determine fluid kinematics, dynamics and flow around submerged bodies.
CO4	Determine various flow and losses through pipes.
CO5	Design of most economical open channel flow section.

Course Code	Course: Engineering Mathematics-III (170304A)
CO1	Solve higher order linear differential equations using appropriate techniques
CO2	Apply Laplace transform and Z-Transform to solve differential equations, difference equations.
CO3	Apply vector calculus concepts to analyze problems and solve system of linear equations by using numerical methods.
CO4	Analyze discrete and continuous random variables using Binomial, Poisson and Normal distributions.
CO5	Analyze data through hypothesis tests like Chi-square and *t*-tests.

Course Code	Course: Artificial Intelligence (170404A)
CO1	Explain the basic principles and scope of Artificial Intelligence and its relevance to different engineering disciplines.
CO2	Apply search algorithms for solving simple engineering problems
CO3	Understand and differentiate between types of machine learning and data representations.
CO4	Identify and analyze AI applications in domains such as predictive maintenance, smart cities, automation, and control systems.
CO5	Recognize ethical, social, and professional issues in deploying AI solutions in engineering contexts.

Course Code	Course: IPR and Ethics (171305A)
CO1	Understand the basics of intellectual property rights.
CO2	Learn the patent filing process.
CO3	Understand the copyright/trademark/industrial design and filing process.
CO4	Understand the importance of ethics in their personal and professional life.
CO5	Learn the workplace responsibilities and rights as an engineer in the industry.

Course Code	Course: Renewable Energy (171305B)
CO1	Describe the basics of renewable energy.
CO2	Explain the constructional details and working of hydro-electric power plant.
CO3	Describe the fundamentals and technology to harness solar energy.
CO4	Explain the wind energy conversion system.
CO5	Discuss the bio-energy conversion pathways.

Course Code	Course: Health, Care & Management System (171305C)
CO1	Understand the structure and function of key human body systems relevant to healthcare and diagnosis.
CO2	Identify common health issues and explain their causes, symptoms.
CO3	Describe the working principles and applications of basic biomedical instruments used in diagnosis and monitoring.
CO4	Analyze the role of advanced medical devices and imaging systems in clinical decision making and treatment.
CO5	Explain the components of hospital management system and significance of digital health technologies like Electronic Health Records (EHR), telemedicine and emergency tracking**.**

Course Code	Course: Smart City and Infrastructure (171305D)
CO1	Describe the concept, features, and components of smart cities with relevant examples.
CO2	Demonstrate the structure and regulatory mechanisms of smart city development in context of Indian and international benchmarks.
CO3	Apply GIS and remote sensing techniques for spatial analysis and infrastructure planning in smart cities.
CO4	Relate smart transportation technologies and their role in improving urban mobility and sustainability.
CO5	Suggest smart solutions for urban water, air and waste management using IOT technologies**.**

Course Code	Course: Entrepreneurship Development (172306)
CO1	Explain the concept of entrepreneurship and its importance in economic and social development.
CO2	Identify, evaluate, and validate innovative business ideas using market research techniques.
CO3	Analyze startup funding options, revenue models, and financial feasibility of new businesses.
CO4	Demonstrate the ability to pitch business ideas effectively to potential stakeholders.
CO5	Develop a structured business plan incorporating all key aspects of entrepreneurship.

Course Code	Course: Business Economics (172406)
CO1	Understand the role of economics in business decision-making and analyze real-world economic scenarios.
CO2	Apply demand and supply principles to determine market equilibrium and pricing strategies.
CO3	Analyze cost structures, profitability and break-even points in business operations.
CO4	Evaluate the impact of business cycles, inflation, and government economic policies on industries.
CO5	Develop pricing strategies based on competitive analysis and consumer demand

Course Code	Course: Universal Human Values (173307)
CO1	Explore a holistic vision of life, including the self and surroundings.
CO2	Recognize the co-existence of self, realize harmony, and comprehend the true happiness.
CO3	Apply strategies that foster harmony in family and society through effective communication and relationship-building to cultivate social well-being.
CO4	Execute self-regulations to mutually fulfilling human behavior and enriching interaction with nature to realize harmony.
CO5	Emphasize the implications of a holistic approach in terms of ethical human conduct, and transit towards value based life.

Course Code	Course: Environmental Studies (173407)
CO1	Describe the importance of environmental studies and the sustainable use of natural resources.
CO2	Explain the structure and function of ecosystems and the significance of biodiversity.
CO3	Identify various types of environmental pollution and their control measures
CO4	Discuss key environmental issues, policies and their impact on society.
CO5	Observe and report environmental conditions and features through field activities**.**

Course Code	Course: Community Engagement /Field Projects (105308)
CO1	Explore relevance between theory and practice through community-based problem learning.
CO2	Identify real-life socio-technical problems and develop the solution.
CO3	Implement a wisdom of empathy and social responsibility to meet complex global challenges.
CO4	Develop innovative ideas in collaboration with society through community-based research methods.
CO5	Analyze the need of research projects and develop a plan for betterment of public service values through active citizenship**.**

SE Civil
Course Outcomes (2019 Pattern)
Semester – II

Course Code	Course: Geotechnical Engineering (105401)
CO1	Classify the soil, on the basis of index properties and formation process.
CO2	Describe the permeability and seepage characteristics of soil.
CO3	Demonstrate the effects of compaction on soil behavior and stress distribution.
CO4	Determine the shear strength of soil under various drainage conditions.
CO5	Explain the process of subsurface investigation and the various types of foundations.

Course Code	Course: Surveying and Geomatics (105402)
CO1	Demonstrate concept of compass surveying, plane table surveying and leveling on field measurements
CO2	Demonstrate concept of theodolite surveying on field measurements.
CO3	Apply concept of tacheometry and contouring.
CO4	Apply concept construction survey and curves.
CO5	Describe geodetic survey, hydrograph survey and aerial photogrammetry and apply modern techniques on field measurements

Course Code	Course: Structural Analysis (105403)
CO1	Explain the basic concept and able to analyze redundant structure.
CO2	Analyze beams and portal frames using Slope and deflection method.
CO3	Analyze beams and portal frames using moment distribution method.
CO4	Analyze the structure using stiffness matrix method.
CO5	Apply the concepts of plastic analysis in the analysis of steel structures.

Course Code	Course: Artificial Intelligence (170404A)
CO1	Explain the basic principles and scope of Artificial Intelligence and its relevance to different engineering disciplines.
CO2	Apply search algorithms for solving simple engineering problems
CO3	Understand and differentiate between types of machine learning and data representations.
CO4	Identify and analyze AI applications in domains such as predictive maintenance, smart cities, automation, and control systems.
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CO4	Analyze discrete and continuous random variables using Binomial, Poisson and Normal distributions.
CO5	Analyze data through hypothesis tests like Chi-square and *t*-tests.

Course Code	Course: Cyber Security and Laws (171405A)
CO1	Understand the basics of cyber security.
CO2	Study ethical hacking techniques and hacker methodologies.
CO3	Identify and classify various types of cyber crimes and related cyber laws.
CO4	Apply methods for cyber forensics.
CO5	Use of AI in cyber security.

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CO5	Develop a structured business plan incorporating all key aspects of entrepreneurship**.**

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CO3	Identify various types of environmental pollution and their control measures
CO4	Discuss key environmental issues, policies and their impact on society.
CO5	Observe and report environmental conditions and features through field activities**.**

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CO1	Explore a holistic vision of life, including the self and surroundings.
CO2	Recognize the co-existence of self, realize harmony, and comprehend the true happiness.
CO3	Apply strategies that foster harmony in family and society through effective communication and relationship-building to cultivate social well-being.
CO4	Execute self-regulations to mutually fulfilling human behavior and enriching interaction with nature to realize harmony.
CO5	Emphasize the implications of a holistic approach in terms of ethical human conduct, and transit towards value based life.

Course Code	Course: Foreign Languages (174408)
CO1	Learn the basic phonetics, alphabets and sounds of the selected foreign language.
CO2	Interpret and use everyday vocabulary to manage simple social interaction.
CO3	Form simple sentences using basic grammatical structures and sentence patterns.
CO4	Participate in simple conversations and everyday communication situations relevant to academic, social and professional contexts.
CO5	Demonstrate cultural awareness and appropriate language behavior to facilitate global and cross-cultural interactions.

Course Code	Course: Software and Techniques in Civil Engg (AutoCAD) (105409)
CO1	Demonstrate the operation of the software.
CO2	Create engineering drawings using AutoCAD software.
CO3	Analyze the results of the model using AutoCAD software.

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Course Outcome (2019 Pattern)
Semester - II

Course Code	Course: Wastewater Engineering (301012)
C314.1	Recall sanitation infrastructure, quantification and characterization of wastewater, natural purification of streams.
C314.2	Design preliminary and primary unit operations in wastewater treatment plant.
C314.3	Understand theory and mechanism of aerobic biological treatment system and to design activated sludge process.
C314.4	Understand and design suspended and attached growth wastewater treatment systems.
C314.5	Explain and apply the concept of contaminant removal by anaerobic, tertiary and emerging wastewater treatment systems.
C314.6	Compare various sludge management systems and explain the potential of recycle and reuse of wastewater treatment.

Course Code	Course: Design of RC Structures (301013)
C315.1	Assess different design philosophies of R.C.C. structure and estimate the moment carrying capacity of singly, Doubly and Flanged section.
C315.2	Design & detailing of rectangular one way and two-way slab with different boundary conditions
C315.3	Design & detailing of dog legged and open well staircase
C315.4	Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion.
C315.5	Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion.
C315.6	Design & detailing of short columns subjected to axial load, uni-axial/bi-axial bending

Course Code	Course: Remote Sensing and GIS (301014)
C316.1	Articulate fundamentals and principles of RS techniques.
C316.2	Demonstrate the knowledge of remote sensing and sensor characteristics.
C316.3	Distinguish working of various spaces-based positioning systems.
C316.4	Analyze the RS data and image processing to utilize in civil engineering
C316.5	Explain fundamentals and applications of RS and GIS
C316.6	Acquire skills of data processing and its applications using GIS

Course Code	Course: Elective II Advanced Engineering Geology with Rock Mechanics (301015-a)
C317.1	Illustrate seismic zones, plate tectonics and civil engineering significance of major rock formations of India with their characteristics.
C317.2	Explain soil profile, geo-hydrological characters of various rock formations and necessity of geological studies in water conservation.
C317.3	Apply knowledge of geology in Infrastructural, Urban development and demonstrate importance of national wealth.
C317.4	Validate the suitability of rocks based on mechanical properties, R.Q.D. and geophysical exploration.
C317.5	Explore subsurface Geology for civil engineering projects to suggest foundation treatments for various geological defects and channel erosion.
C317.6	Illustrate the suitability of proposed alignments for tunnels and bridges on the basis of Geological investigations.

Course Code	Course: Internship (301016)
C318.1	Develop professional competence through industry internship
C318.2	Apply academic knowledge in a personal and professional environment
C318.3	Build the professional network and expose students to future employees
C318.4	Apply professional and societal ethics in their day-to-day life
C318.5	Become a responsible professional having social, economic, and administrative considerations
C318.6	Make own career goals and personal aspirations

Course Code	Course: Wastewater Engineering Lab (301017)
C319.1	Determine the physical, chemical, and biological characteristics of wastewater sample.
C319.2	Illustrate the working of sewage treatment units.
C319.3	Design sewage treatment plant
C319.4	Explain sewer materials, choice of materials, testing of sewer pipes, sewer appurtenances.

Course Code	Course: Design of RC Structures Lab. (301018)
C320.1	Design of slab as per 456-2000 and detailing as per SP 34- 1987
C320.2	Design of beam as per 456-2000 and detailing as per SP 34- 1987
C320.3	Design of column as per 456-2000 and detailing as per SP 34- 1987
C320.4	Design of footing as per 456-2000 and detailing as per SP 34- 1987

Course Code	Course: Remote Sensing and GIS Lab. (301019)
C321.1	Summaries the fundamental tools and steps to import and export data in GIS software.
C321.2	Generate thematic maps using GIS software.
C321.3	Interpret the data from the aerial photographs and satellite images.
C321.4	Apply RS & GIS techniques for development of smart cities, land use classification and DEM for geomorphological features.

Course Code	Course: Elective II Advanced Engineering Geology with Rock Mechanics Lab (301020-a)
C322.1	Explain Geology, soil profile, seismic zones of India and parameters of morphometric analysis of river.
C322.2	Examine the site suitability for civil engineering structures using RQD and electrical resistivity survey.
C322.3	Analyze the drill hole data to check suitability of site for civil engineering projects.
C322.4	Illustrate geological aspects of civil engineering project in field and their significance in civil engineering.

Course Code	Audit Course II (C323) Industrial Safety301021)
C323.1	Classify techniques for industrial safety
C323.2	Explain techniques for industrial safety performance and preventions of accidents
C323.3	Illustrate general accident prevention, safety measures and training elements.
C323.4	Explain safety work practices, job safety analysis and reporting of accidental occurrences.

Course Code	Honours Course: -Sustainable Architectural and Landscape Design (301403)
C324.1	Describe the planning technologies used in ancient India
C324.2	Explain basics of sustainable development
C324.3	Study techniques for sustainable planning
C324.4	Demonstrate knowledge of fundamental concept and idea in the field of landscape architectures
C324.5	Express Knowledge of landscape architecture on field
C324.6	Compare the landscape planning in urban and rural areas and landscape treatment in special areas.

BE CIVIL
Course Outcome (2019 Pattern)
Semester - I

Course Code	Course: Foundation Engineering (401001)
C401.1	Perform subsurface investigations for foundations using different methods.
C401.2	Estimate the bearing capacity of shallow foundations.
C401.3	Calculate immediate and primary consolidation settlement of shallow foundations.
C401.4	Decide the capacity of a pile and pile group.
C401.5	Understand the steps in geotechnical design of shallow foundations and well foundations.
C401.6	Analyse problems related to expansive soil and overcome them using design principles, construction techniques in black cotton soil.

Course Code	Course: Transportation Engineering (401002)
C402.1	Discuss the highway development and planning.
C402.2	Discuss the traffic engineering and control methods.
C402.3	Design of road geometry with drainage system.
C402.4	Analysis various pavement materials.
C402.5	Design of Road Pavement.
C402.6	Understand the fundamentals of Bridge Engineering and Railway Engineering

Course Code	Course: Elective III Integrated Water Resources Planning & Management (401003.c)
C403c.1	Understand concerned organizations, IWRP & M objectives, principles, challenges, application & analysis of IWRP&M approaches & principles in a case study
C403c.2	Understand PIM, WDS, WALMI, agriculture in the concept of integrated water resources, apply and analyse water requirements for food production
C403c.3	Understand assessment of surface and ground water quality, EIA, CPCB regulations, application & analysis of effluent quality standards as per CPCB
C403c.4	Understand water economics and funding, application & analysis of planning for a sustainable water future
C403c.5	Understand legal regulatory settings of IWRP & M, application & analysis of inter-basin water transfers and IWRP & M
C403c.6	Understand flood control & power generation for IWRP & M, application QIGIS for analysis of a basin for IWRP & M

Course Code	Course: Elective III Operation Research (401003.f)
C403f.1	To get acquainted with the various optimization techniques and their use in civil engineering
C403f.2	Apply stochastic programming to reduce the processing time
C403f.3	To optimize transportation cost and proficiently allocating scare resources to optimize and maximize the profit
C403f.4	To formulate and analyze linear programming problems
C403f.5	To optimize different nonlinear functions
C403f.6	Ability to utilize dynamic programming in decision making for linear programming problems

Course Code	Course: Elective IV Airport and Bridge Engineering (401004-d)
C404d.1	Plan airport as per specifications of international organizations
C404d.2	Plot airport layout and design runway and taxiway
C404d.3	Design runway and taxiway pavements and drainage
C404d.4	Locate heliports w.r.t landing area, marking and lighting
C404d.5	Investigate site for bridge construction and analyze it with different loading conditions
C404d.6	Classify bridges and bearings

Course Code	Course: Project Stage I (401005)
C405.1	Identify thrust area in civil engineering and finalize problem statement.
C405.2	Review the literature to search for technical information from various resources on selected problem.
C405.3	Formulate the appropriate solution methodology.
C405.4	Apply the principles, tools and techniques to solve the problem.
C405.5	Prepare a report and presentation of project.

Course Code	Course: Transportation Engineering Lab (401006)
C406.1	Evaluate properties of aggregates as a part of road pavement
C406.2	Evaluate properties of bitumen as a part of road pavement
C406.3	Discuss pavement construction and Apply modern trends in Highway materials.

Course Code	Course: Elective III Integrated Water Resources Planning & Management Lab (401007-c)
C407c.1	Analyze the components and approaches of Integrated Water Resources Planning and Management (IWRP &M), national water policy, participatory irrigation management and water distribution societies.
C407c.2	Compare the effluent quality standards as per CPCB
C407c.3	Illustrate the economics in IWRP & M and decision making, Dublin Principles (1992), water laws (National, State & Local), global water partnership (GWP).
C407c.4	Summarize the application of soft computing tool for flood forecasting and QGIS for IWRM.

Course Code	Course: Elective III Operation Research Lab (401007-f)
C407f.1	To get acquainted with the various optimization techniques and their use in civil engineering
C407f.2	Apply stochastic programming to reduce the processing time
C407f.3	To optimize transportation cost and proficiently allocating scare resources to optimize and maximize the profit
C407f.4	To formulate and analyze linear programming problems
C407f.5	To optimize different nonlinear functions
C407f.6	Ability to utilize dynamic programming in decision making for linear programming problems

Course Code	Course: Elective IV Airport and Bridge Engineering Lab (401008-d)
C408d.1	Design runways with the required length and make necessary corrections while creating sketches of essential runway markings.
C408d.2	Design both pipe culverts and box culverts with a focus on structural and hydraulic considerations.
C408d.3	Demonstrate their ability to perform structural design for flexible or rigid pavements, considering design factors.
C408d.4	Present report on a topic related to the latest trends in airport planning and design, bridge site selection, or other relevant aspects of airport and bridge engineering, showcasing their research and presentation skills.

Course Code	Course: Computer Programming in Civil Engineering Lab (401009)
C409.1	Understand the basics of python programming language
C409.2	Write python codes to solve problems in civil engineering

Course Code	Course: Audit Course I (401010)
C410.1	Develop an understanding of workplace codes, professionalism at workplace
C410.2	Learn the workplace ethics
C410.3	Develop an understanding of Business ethics, workplace privacy and ethics
C410.4	Learn teamwork at workplace

Course Code	Course: Honor's Course: - Traffic and Transportation Planning(401401)
C4H1.1.	Understand traffic characteristics and methodology.
C4H1.2	Study traffic flow analysis.
C4H1.3	Understand design standards of transport.
C4H1.4	Design rotary intersection, at grade intersection and grade separated intersection
C4H1.5	Understand transport land use pattern
C4H1.6	Understand how to plan sustainable urban transportation with transportation system

BE Civil
Course Outcome (2019 Pattern)
Semester – II

Course Code	Course: Dams and Hydraulic Structures (401011)
C411.1	Understand types of dams and instrumentation working
C411.2	Execute stability analysis of Gravity Dam
C411.3	Understand types of spillways & Design of Ogee spillway
C411.4	Illustrate the failures and analyze stability of earthen dam
C411.5	Design Canals and understand the canal structures
C411.6	Analysis of the Diversion headwork and Cross Drainage work

Course Code	Course: Quantity Surveying, Contracts and Tenders (401012)
C412.1	Understand concept of estimates and prepare approximate estimate for various for Civil Engineering works.
C412.2	Describe tendering process, construction contracts, and aspects of Arbitration and prepare tender documents.
C412.3	Prepare detailed estimate of various items of work by different methods and calculate quantity of steel from Bar bending schedule.
C412.4	Apply engineering knowledge to prepare estimate for roads, culverts, and water tank (Elevated storage tank
C412.5	Apply concepts of specification to draft brief specification, detailed specification and prepare detailed rate analysis report.
C412.6	Evaluate depreciation and valuation of property on the basis of present condition, specifications and market trend.

Course Code	Course: Elective V Hydropower Engineering (401013-e)
C413e.1	Understand the classification of power resources & trends in energy use patterns
C413e.2	Identify the components of hydro power plant.
C413e.3	Analyze the load assessment for turbines.
C413e.4	Prepare the layout of powerhouse based on the various structures need for it.
C413e.5	Design the turbines and surge tanks.
C413e.6	Understand the laws and regulatory aspects of hydroelectric power

Course Code	Course: Elective VI TQM and MIS (401014-a)
C414a.1	Recognize quality and contribution of quality gurus for of best practices.
C414a.2	Relate the functioning and application of TQM & Six Sigma in the domain of construction sector
C414a.3	Understand ISO 9001 principles in preparation of quality manual to construction business
C414a.4	Understand management control & certification systems for construction industry
C414a.5	Choose TQM process implementation and various quality awards for construction sector
C414a.6	Propose MIS for allied fields in construction sector

Course Code	Course: Elective VI Green Structures and Smart Cities (401014-d)
C414d.1	Describe the importance of energy and minimization by altering the building materials.
C414d.2	Understand the importance of green construction and green rating system
C414d.3	Introduction of the applications of energy conservation and efficiency practices in buildings.
C414d.4	Understand phases and approval involved in smart city project
C414d.5	Assess the national and global experience of smart cities.
C414d.6	Understand the importance of sustainable development and current protocol of sustainable development goals

Course Code	Course: Project Stage II (401015)
C415.1	Identify thrust area in civil engineering and finalize problem statement.
C415.2	Review the literature to search for technical information from various resources on selected problem.
C415.3	Formulate the appropriate solution methodology.
C415.4	Apply the principles, tools and techniques to solve the problem.
C415.5	Prepare a report and presentation of project.

Course Code	Course: Dams and Hydraulics Structures Lab (401016)
C416.1	Understand different types of dams
C416.2	Execute stability analysis of gravity dam and earthen dam
C416.3	Design of profile spillway and energy dissipation device below the spillway
C416.4	Analysis of weirs on permeable foundations

Course Code	Course: Dams and Hydraulics Structures Lab (401016)
C416.5	Design of lined canal
C416.6	Understand the different components, working of gravity dam, earthen dam.

Course Code	Course: Quantity Surveying, Contracts and Tenders Lab (401017)
C417.1	Understand concept of estimates and prepare approximate estimate for various for Civil Engineering works.
C417.2	Prepare a tender documents with conditions of contracts,
C417.3	Prepare a detailed estimate for load bearing structures
C417.5	Apply concepts of the specification to draft brief specification, detailed specification and prepare detailed rate analysis report.
C417.6	Evaluate depreciation and valuation of property on the basis of present condition, specifications and market trend.
C417.1	Understand concept of estimates and prepare approximate estimate for various for Civil Engineering works.

Course Code	Course: Elective V Hydropower Engineering Lab (401018-e)
C418e.1	Assess the load and power output of an hydroelectric power plant
C418e.2	Design turbines and draft tube
C418e.3	Design water conveyance system components
C418e.4	Justify the economics and environmental impact of hydroelectric power plant

Course Code	Course: Audit Course II (401019)
C419.1	Gather Knowledge about Human rights and Human rights Movement
C419.2	Develop understanding of Human rights and Indian Constitution
C419.3	Discuss Human Rights of the Different Sections and contemporary issues
C419.4	Discuss International scenario towards human rights with reference to engineering Industry

Course Code	Course: Honor's Course: - Land Use and Land Cover (401403)
C4H2.1	C4H2.1 Understand how to use history of town planning for design of new area.
C4H2.2	C4H2.2 Analyze urban settlement and growth pattern of area.
C4H2.3	C4H2.3 Understand surveys required to be conducted for area planning.

Course Code	Course: Honor's Course: - Land Use and Land Cover (401403)
C4H2.4	C4H2.4 Understand different land use classification.
C4H2.5	C4H2.5 Identify role of different planning agencies in urban land use development.
C4H2.6	C4H2.6 Understand how to use different area planning tools for land use and land cover activity.